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ABSTRACT

Designed to present interesting facts about science and to heighten the curiosity of primary age students, this book contains suggestions for students to investigate the natural world and numerous black and white illustrations. The activities focus on nine easily recognized insects: bees, beetles, lady bugs, lightning bugs, ants, mosquitoes, flies, butterflies, and moths. Exercises are also included on the parts of insects and the types on insects. Directives for the individual activities are provided in the teacher/parent guide section. These include suggestions for: (1) discussion questions; (2) the actual activities; (3) vocabulary list; and in most cases (4) extended activities. (ML)

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A GOOD APPLE ACTIVITY BOOK FOR PRIMARY GRADES

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EXPLORE

Insects

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BOOK 2 PRIMARY LEVEL

SE 041 850

By Linda Penn Illustrated by Charlene Czerniak

YOUNG SCIENTISTS EXPLORE

INSECTS

BOOK 2 - PRIMARY LEVEL

by

LINDA PENN

illustrated by **CHARLENE LOCHBIHLER CZERNIAK**

cover design by **TOM SJOERDSMA**

ISBN No. 0-86653-070-3

Printing No.

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PREFACE

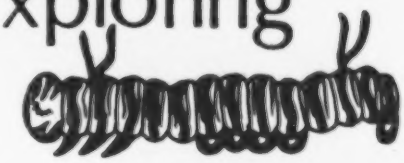
Every classroom has a need for "real" science experiences and kindergarten is not too soon to begin. It can be readily demonstrated that young children possess a healthy curiosity about the living world around them. A child left on his own in a natural environment will quickly become absorbed in the activities of even the smallest living thing. Perhaps owing to their existence in an adult-sized world, the young exhibit a particular affinity towards insects and other tiny creatures.

Young Scientists Explore Insects was developed to take advantage of a child's natural curiosity. (A teacher may encounter a few children displaying fright or aversion to insects. They are usually imitating familiar adult reactions and this attitude should disappear altogether as the general enthusiasm of their peers prevails.) The subject matter, as presented, not only stimulates further discovery but sharpens the power of observation in the questioning young mind and initiates problem solving. The scientific information which the child comes to understand through the suggested activities centers around nine easily recognized insects. These activities can be an excellent science starter in the early fall when insect life is humming in preparation for the dormant winter months. The weather during this time of year allows for field trips and schoolyard walks as well as backyard science work at home. These outside experiences help newly learned facts come alive. (Teacher/Parent Guide, page 26). Classroom or home observation of various stages of the butterfly and moth life cycles is also a real possibility in the fall and again in the spring. (Teacher/Parent Guide, page 30).

From personal experience, first as the mother of four curious children and currently as a teacher working with young students, I know insect science provides a tool unlike any other for building the very best in learning skills. Once insects have been approached in science activities, numerous avenues open in every area of learning. The children enjoy finding these newly discovered insects on math papers, in problems, sets and subsets, symmetrical numbering games, etc. Classroom observed insects can provide excellent subject matter for creative writing. Library books on insects will become very popular and reading skills will improve in the process. When it comes to insect science, I have found one exciting learning experience leads to another. My hope is that you, as a teacher and/or parent, will have a similar experience while your **"Young Scientists Explore Insects."**

I LOVE EATING LEAVES!
Caterpillar
Meet Kinky

Kinky Caterpillar Goes Exploring



This is Kinky__ __ __ __ __ __ __ __ __ __ __ __

Who chews plant __ __ __ __ __ __

all day.

If he is feeling very full,

he sometimes crawls away.

You can follow

Kinky

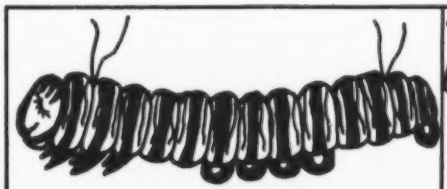
And meet more

__ __ __ __ __ __ __ too.

Learn how __ __ __ __ __ __ __ grow and

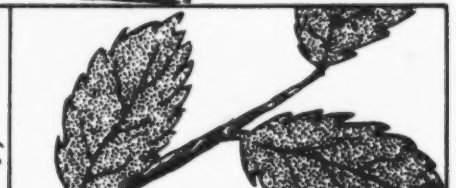
change, where they live,

and things they do.



Caterpillar

Insects



Leaves

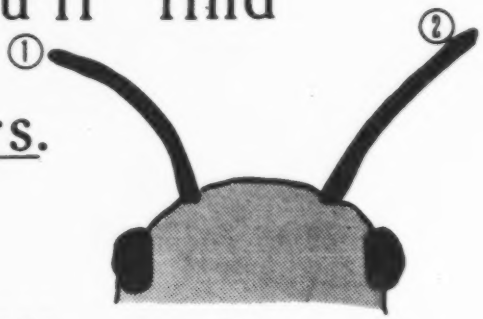
Insects Have Special Parts

There are many insects.

To spot an insect,

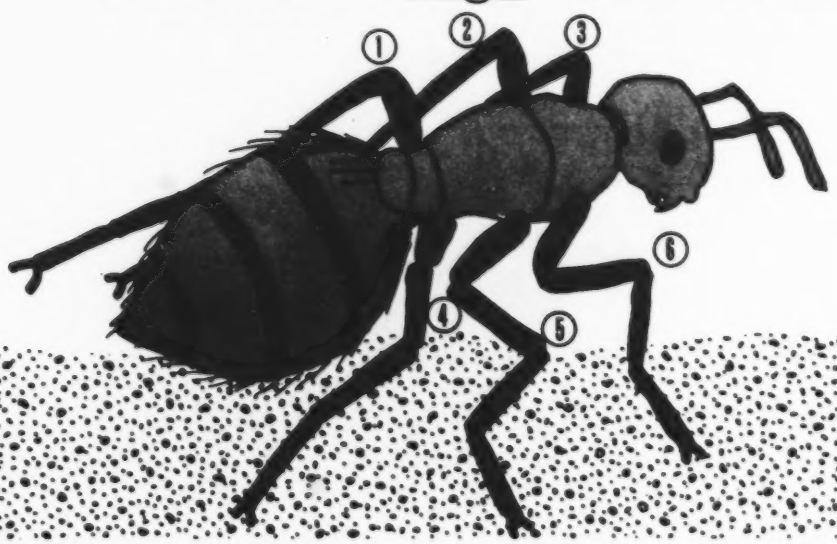
here's a trick.

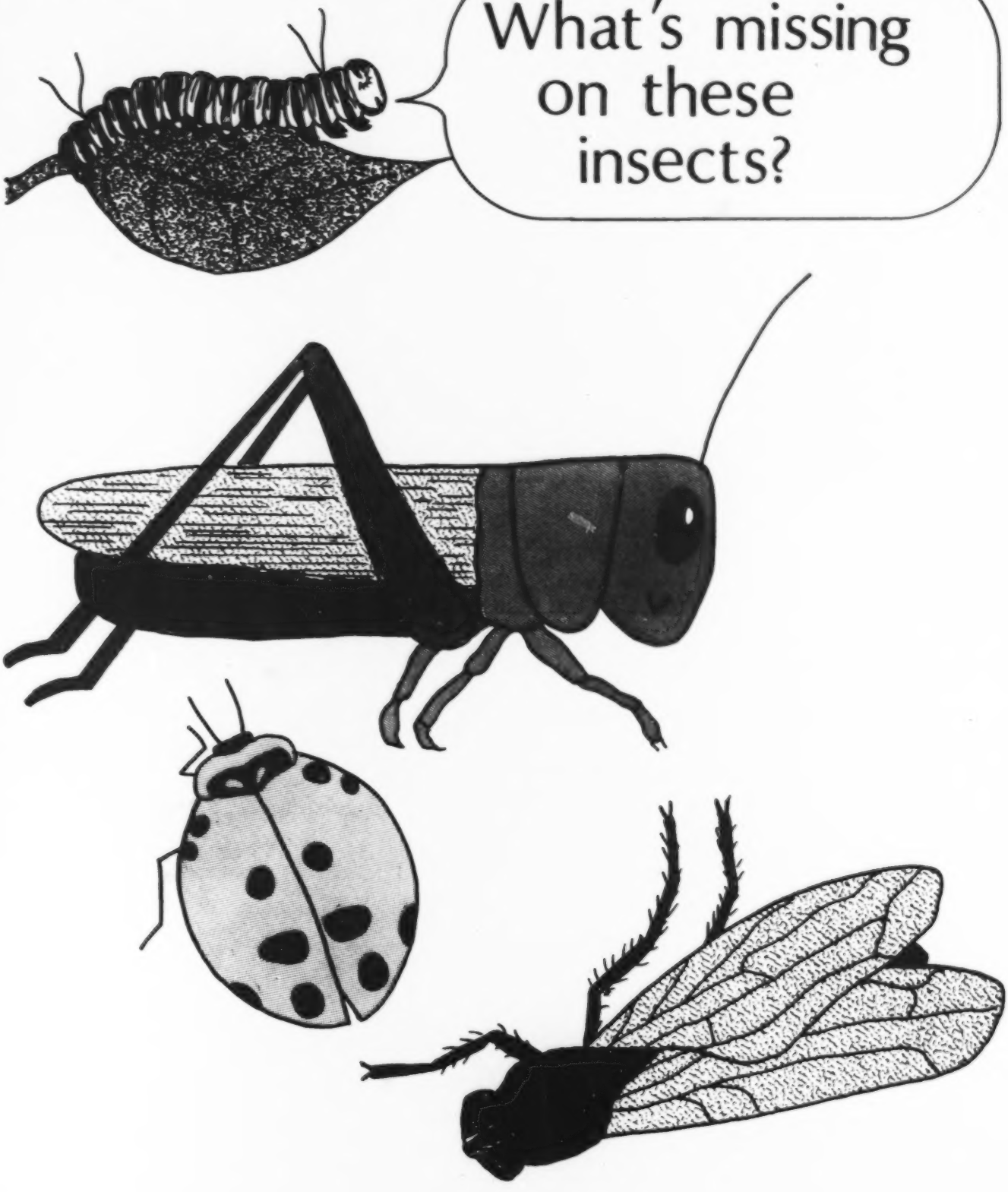
On the head you'll find



two feelers.

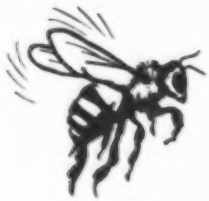
And the legs will number six.




What's missing on these insects?

Friend or Enemy?

Speedy insects,



busy bugs,

Are moving all around.

They are FLYING in the air.

They are CRAWLING on the ground.

Look in Kinky's BIG backyard.

How many do you see?

Circle those you feel are friends

And cross out enemies.

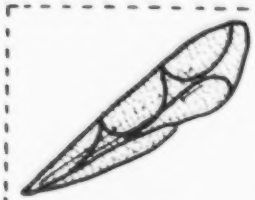
KINKY'S BIG BACKYARD

Bzzz Bzzz Busy Bee

One very busy insect
Is named the honeybee.
It is true that she can **STING**,
But she is **not** an enemy.

I never bother a busy bee, but bees at work are fun to see!

As soon as bees have wings to fly
They work for you and me.
Bees feed on flowers to make honey
And help the flowers form new seeds.



Wings

Antenna

Stinger

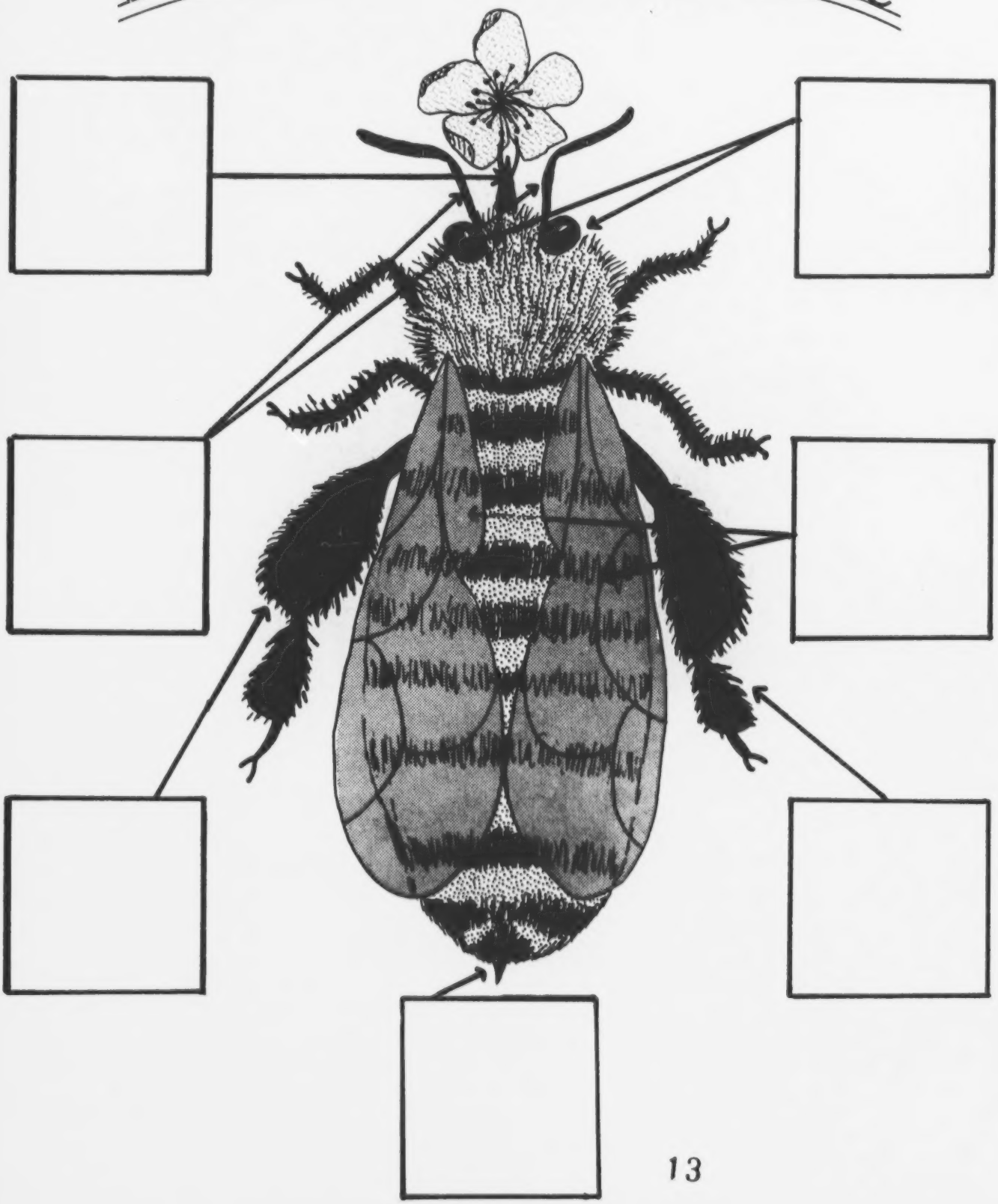
Pollen Brush

Pollen Basket

Compound Eyes

Tongue

Build A Busy Honeybee



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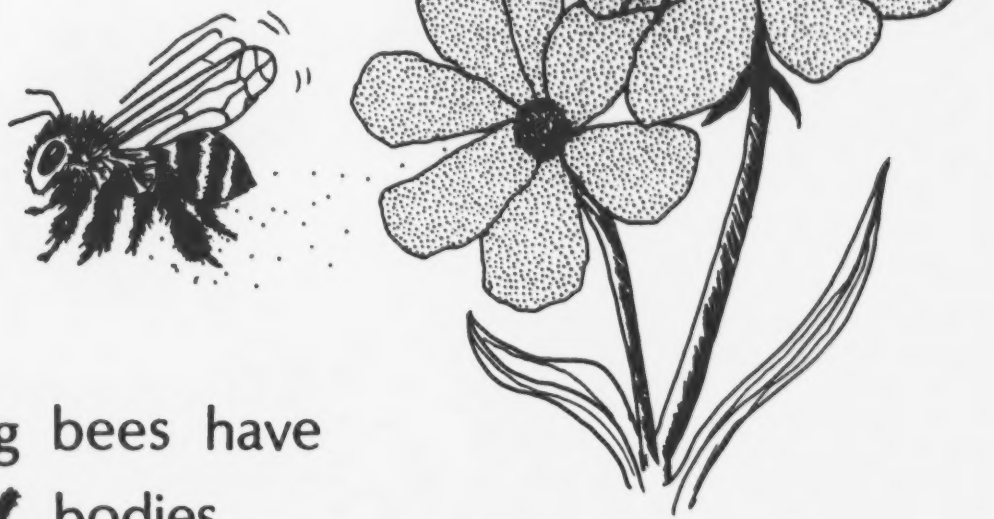
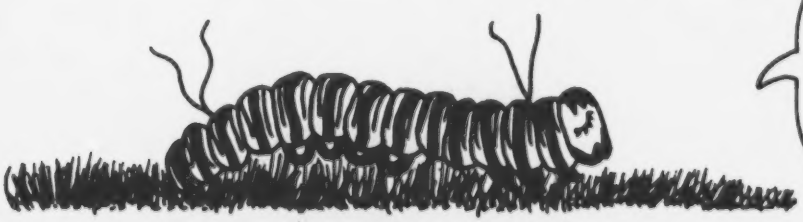
Discovering Pollen

In the middle of most flowers,
There's a *powder* that starts with a "P."
Flowers make it. It's called
POLLEN, and pollen's
picked up by the bees.

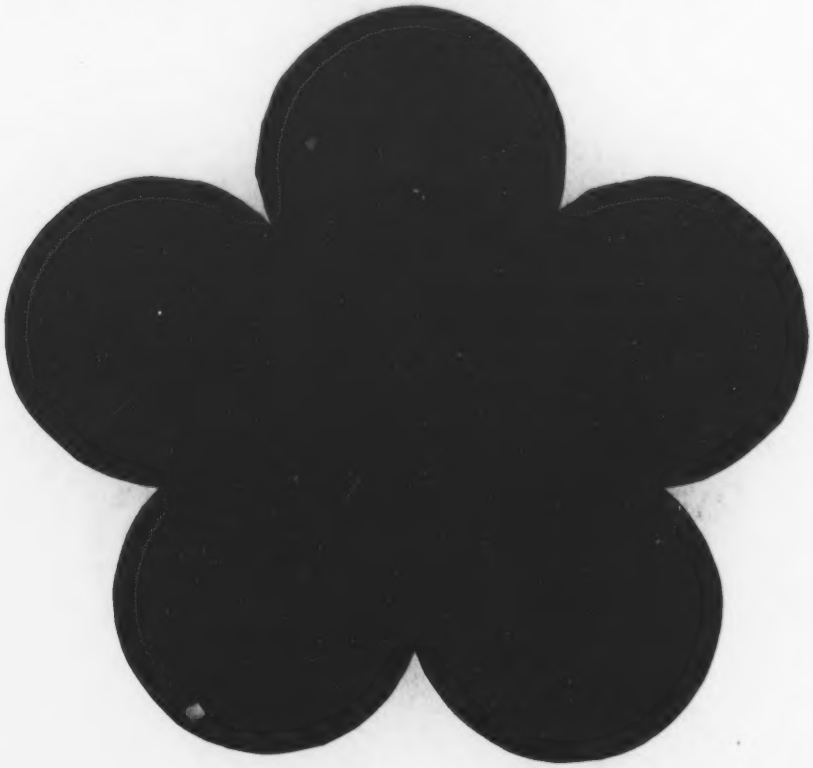


All working bees have
HAIRY bodies
Pollen sticks to as bees feed.
Their back legs have a **brush** and basket
To gather pollen before they leave.



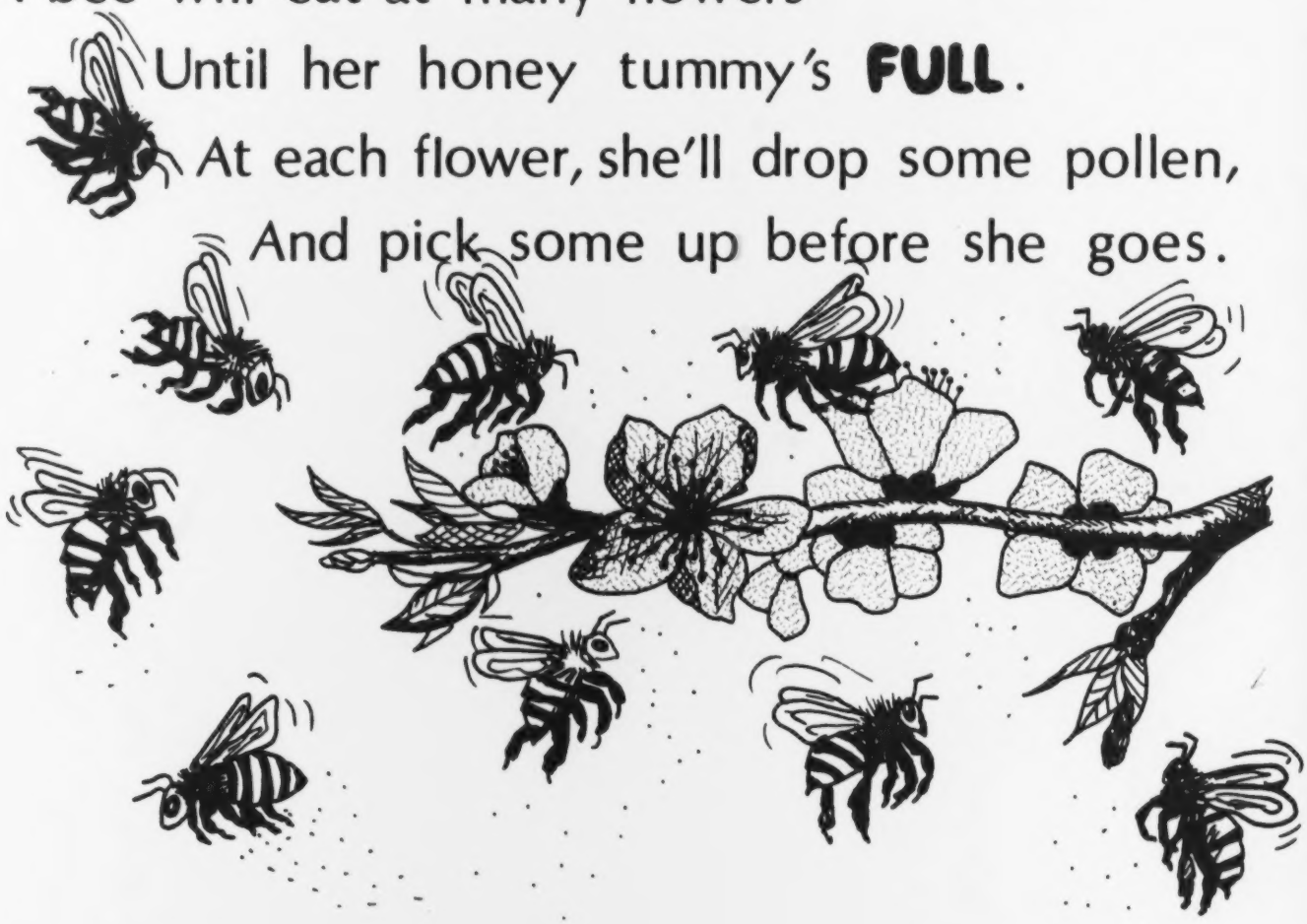
Can you find the bees' pollen baskets? Color them yellow.

DISCOVERING POLLEN EXPERIMENT



BEES, SEEDS, AND ME!

A bee will eat at many flowers
Until her honey tummy's **FULL**.
At each flower, she'll drop some pollen,
And pick some up before she goes.

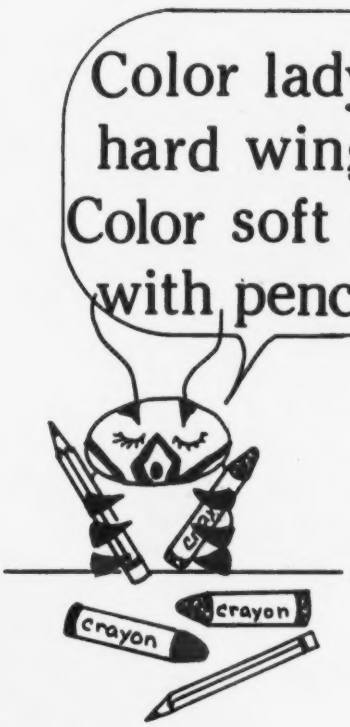


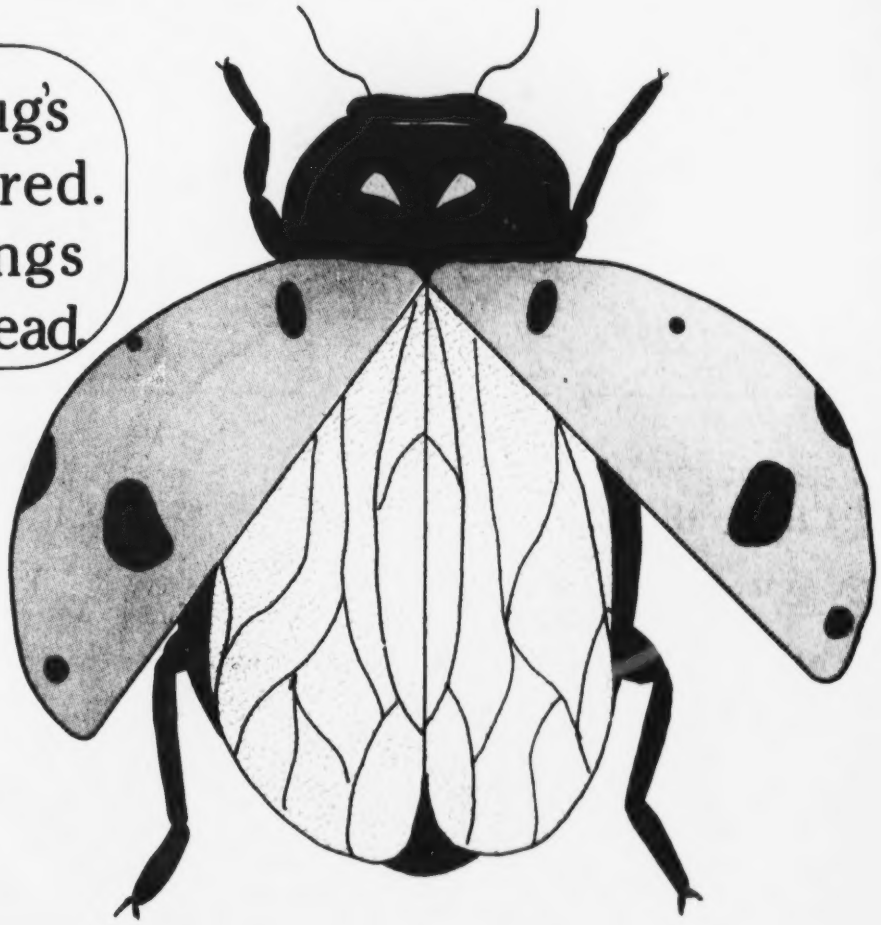
The honeybee is a pollen duster,
And pollen dust helps flowers make seeds.
Special foods like corn and apples
Could not **grOW** without the bees.

Bees help plants make new seeds.
Do you see some you like to eat?

BEETLES ARE LIKE THAT

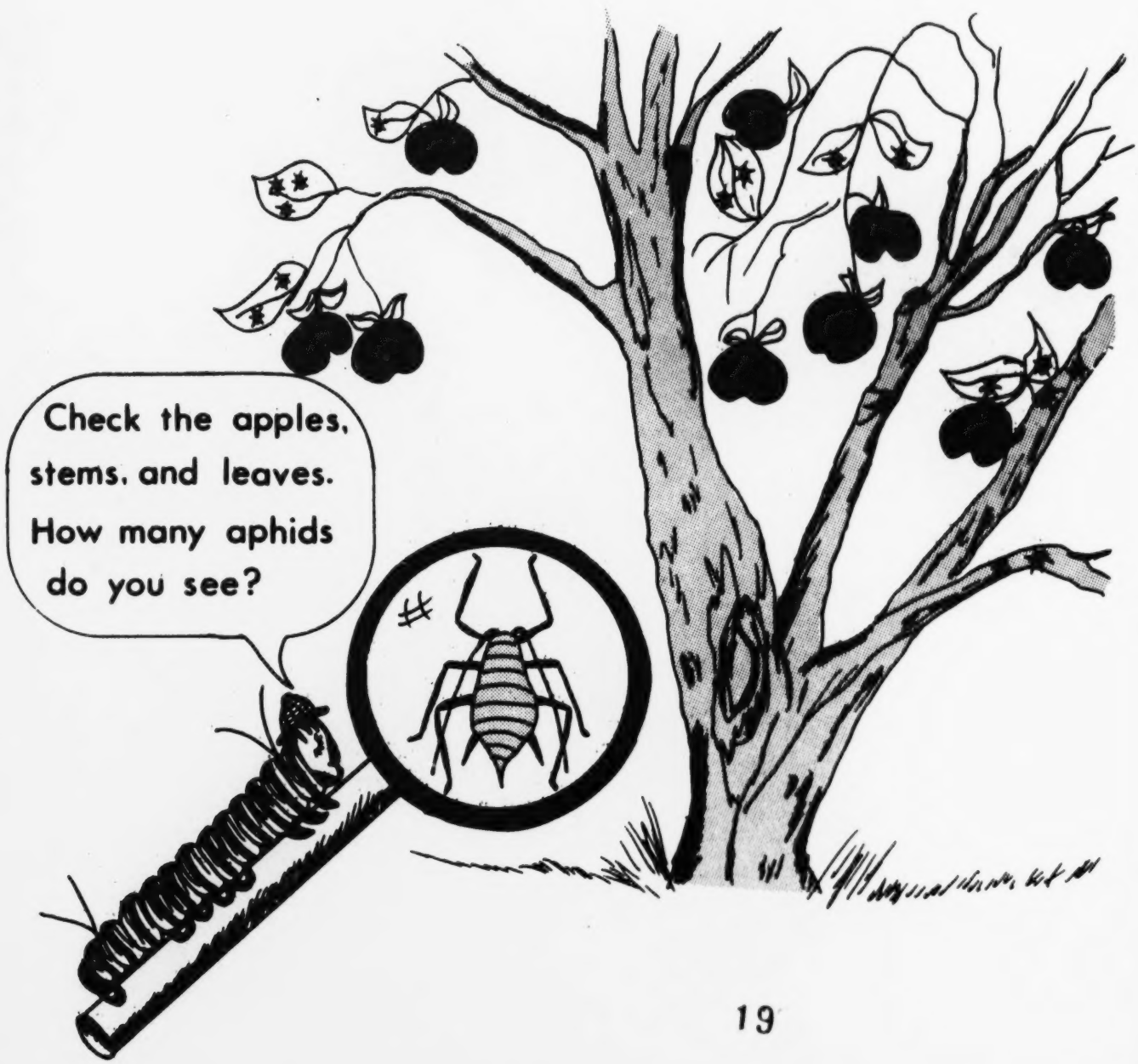
The beetle is an insect
Sometimes called a bug
Because of SOFT wings underneath
And HARDER wings above.





Ladybugs are beetles
With SPOTS on HARD back wings.
Since insect pests they like to eat
They do a very helpful thing.

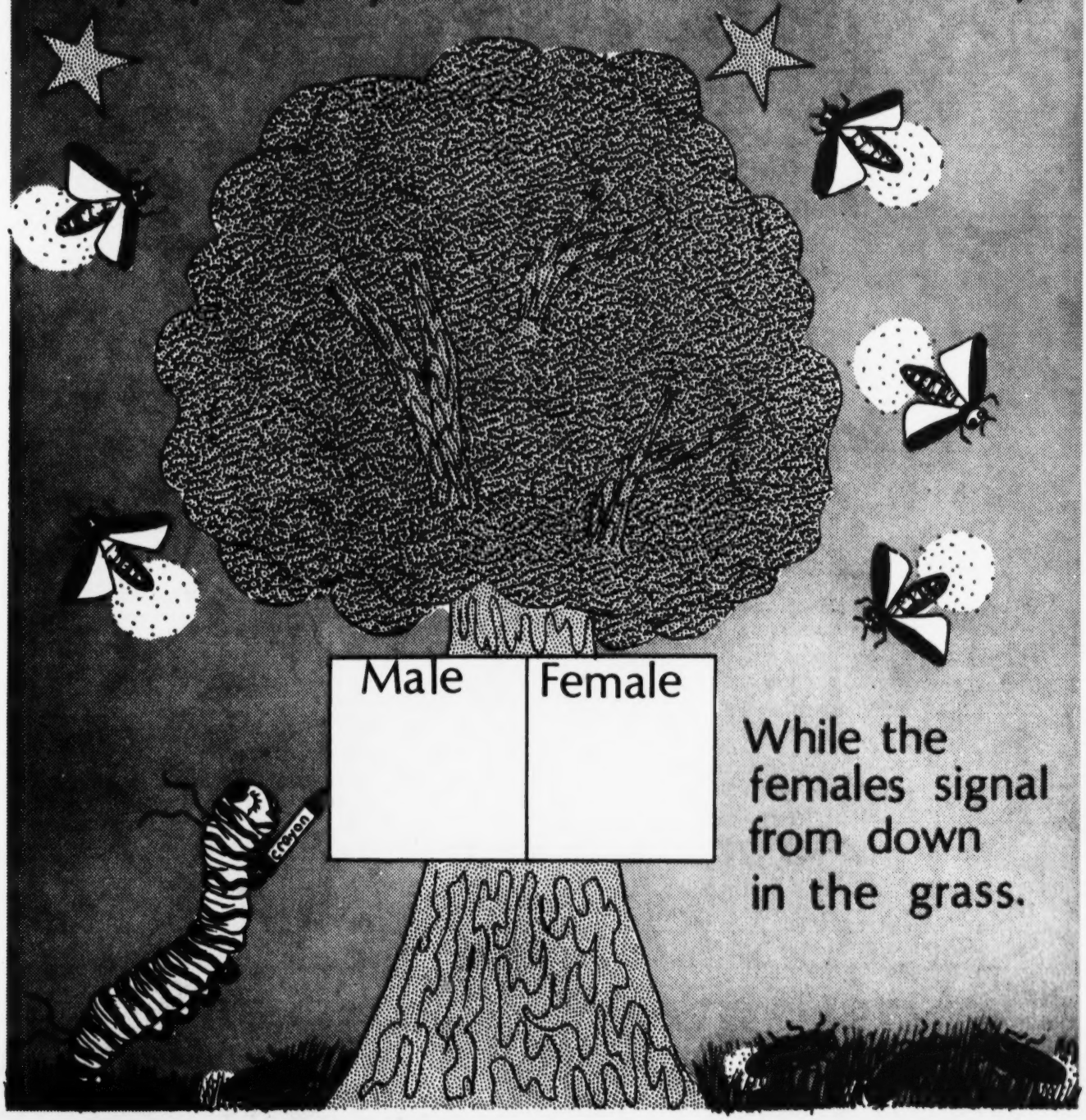
Aphids are insect pests.
They **suck** plant leaves and stems.
It's lucky that the ladybugs
Like to eat LOTS of them.



19

Flashing Lights In The Night

Lightning bugs have special lights
We like to watch on summer nights.
Way up high you can see the males flash,



The Anthill Hotel

Down on the ground

In an anthill "hotel"

There is lots going on.

Take a look. Can you tell...

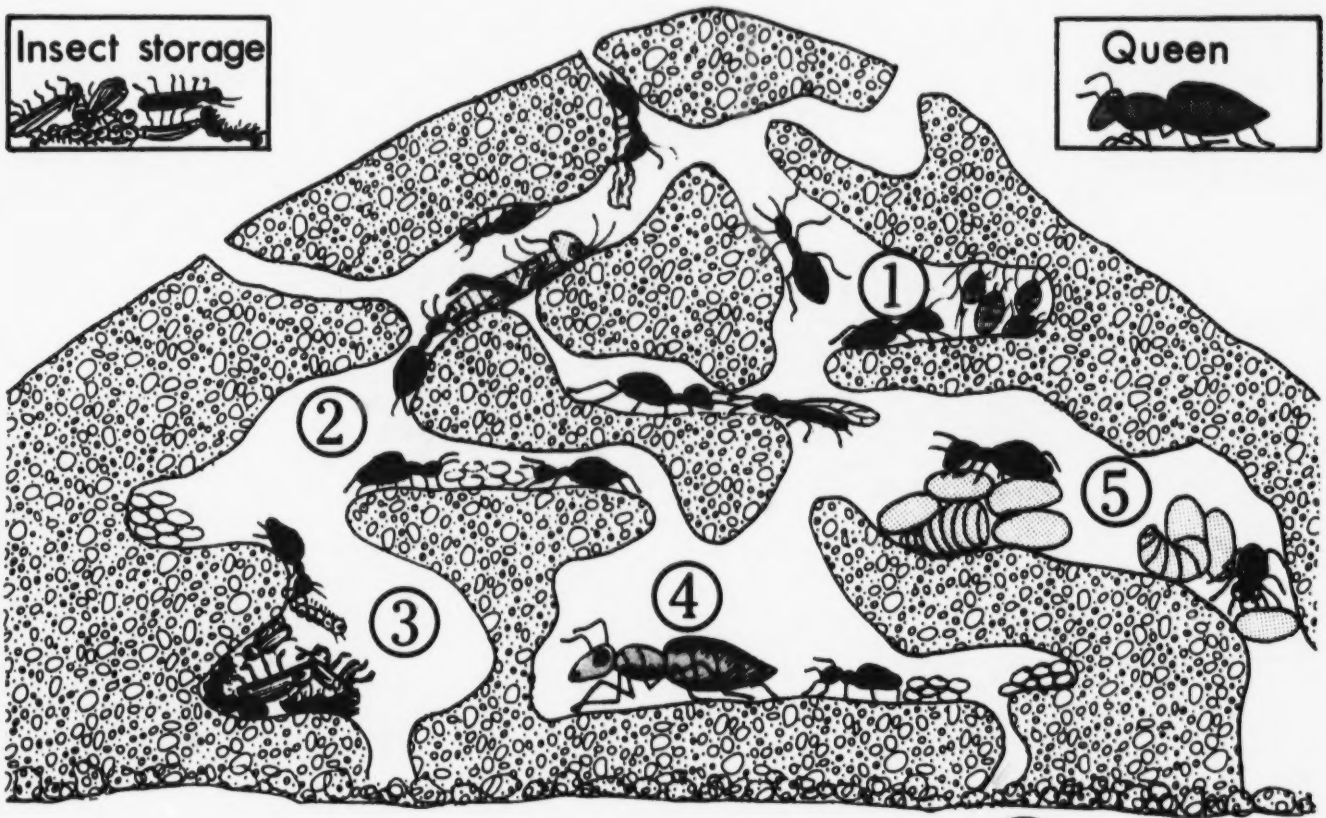
Aphid "cow"

Eggs

Larva-cocoon

Insect storage

Queen

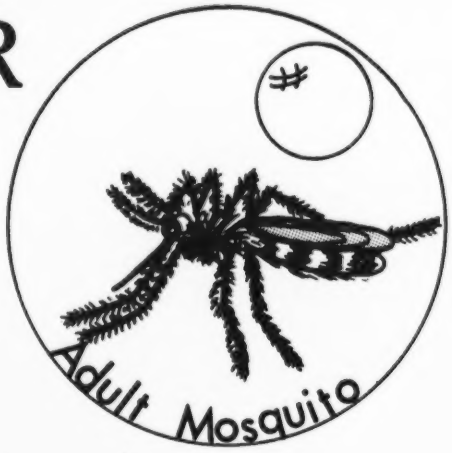


Where is the queen's room? ◯

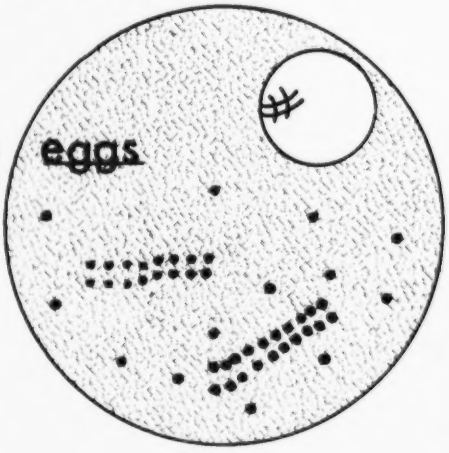
...the larva-cocoon room? ◯ ...egg nursery? ◯

...the honeydew dairy? ◯ ...the storeroom? ◯

PICK A NUMBER AND A NAME

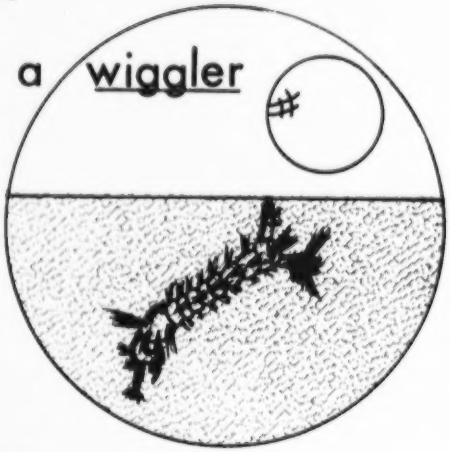


When it is rather damp and warm,
Mosquitoes, the insect pests, are born.
LARGE PONDS or small puddles
They truly don't mind.
As long as it's wet, mosquitoes do fine.
Tiny black SPECKS,
Which really are eggs
Hatch in the water where
They were laid



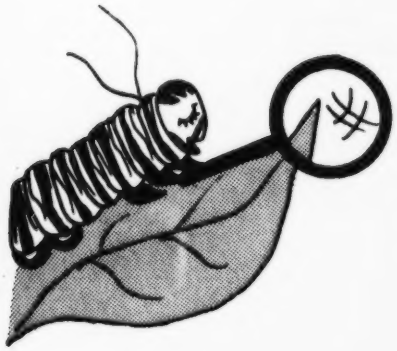
By female mosquitoes, the kind that will BITE
If they find you out on a warm summer night.

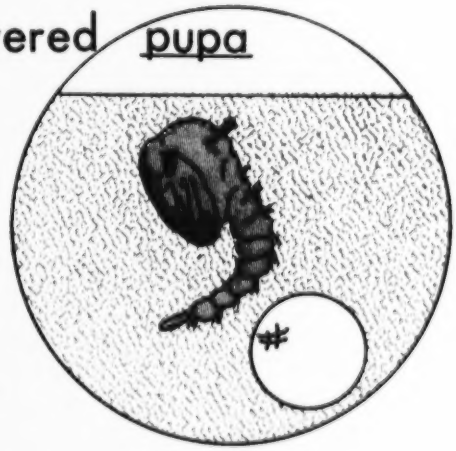
Out of each egg comes
one larva, not two.
You can call it a wiggler
for that's how it moves.



Wigglers must eat
to grow
and to change.
They will shed their tight skin
when no room remains.

When wigglers stop eating,
again they will change
to a case-covered pupa
that looks
very
strange.

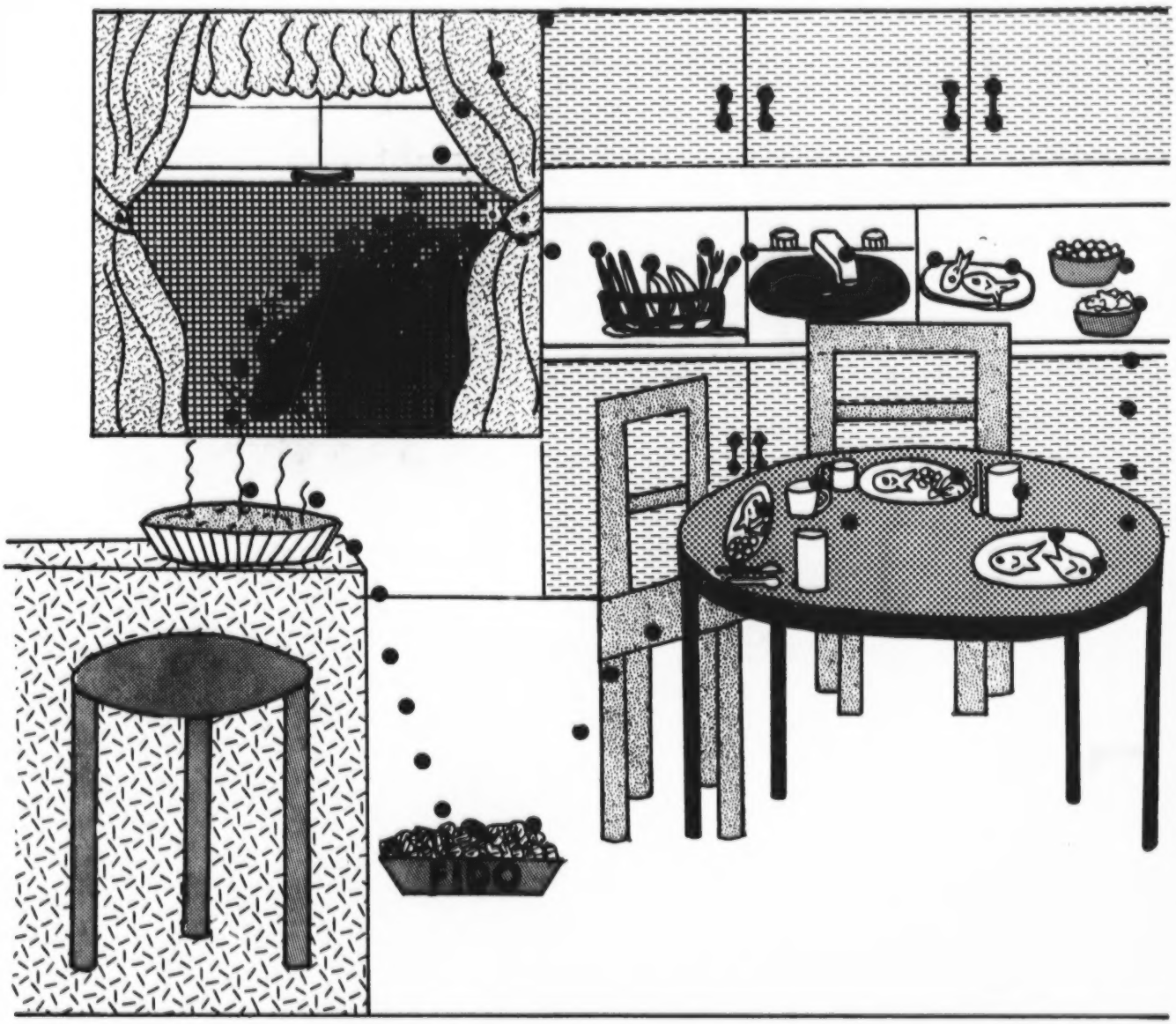




Soon wings, legs, and body the
wiggler replaces,
And grown up mosquitoes

step out of their cases.

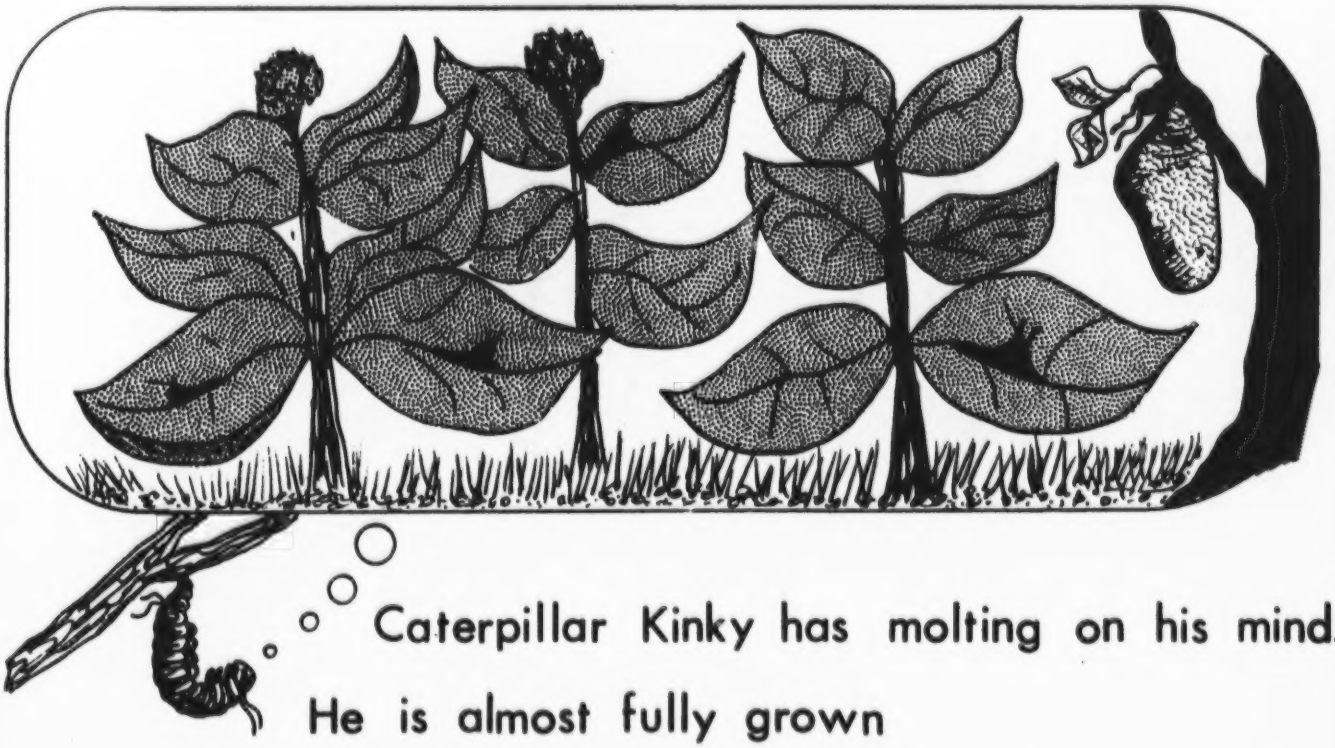
Follow That Fly With The Six Dirty Feet



What should be cleaned
Before anyone eats,
Because they were touched
By the fly's dirty feet?

MOLTING MAGIC

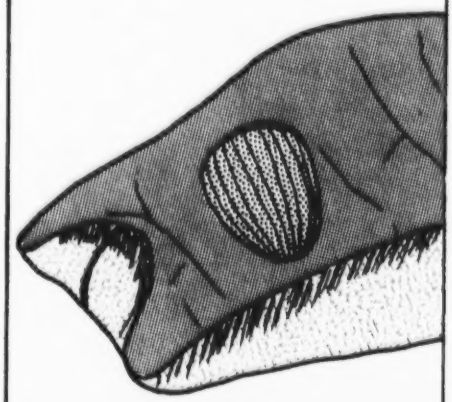
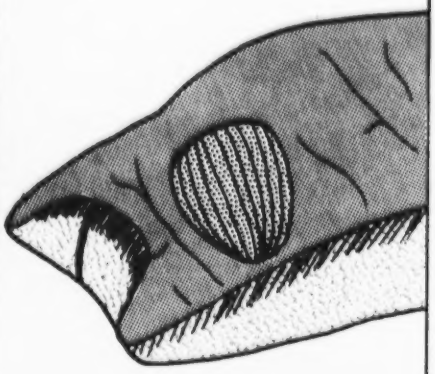
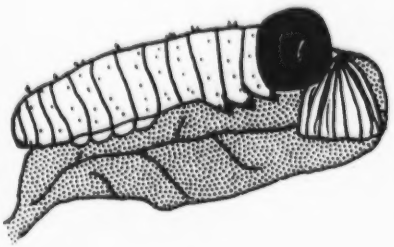
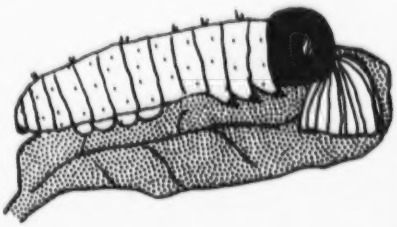
An insect's outer skin can't grow,
So larger skin waits right below.
It simply sheds its outer coat,
And this is what we call a "molt."

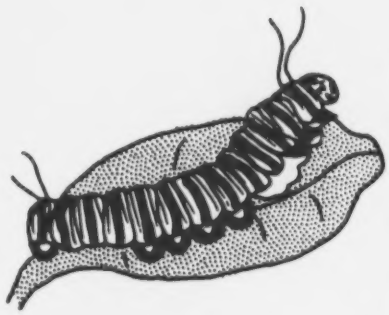


Caterpillar Kinky has molting on his mind.
He is almost fully grown
and needs to molt one last time.
Can you find all Kinky's molts?
Here's a clue. Find five old coats.

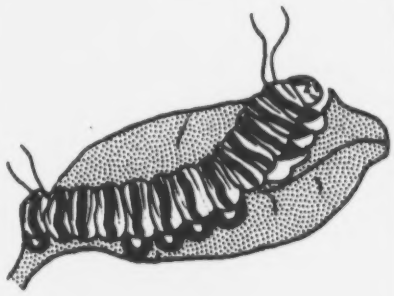
Try this card game while Kinky concentrates on becoming a Monarch Butterfly!

Butterfly Concentration

 (magnified) Monarch Egg	 (magnified) Monarch Egg	 (magnified) Newly-Hatched Monarch
 (magnified) Newly-Hatched Monarch	Monarch Caterpillar After Molting Skin	Monarch Caterpillar After Molting Skin



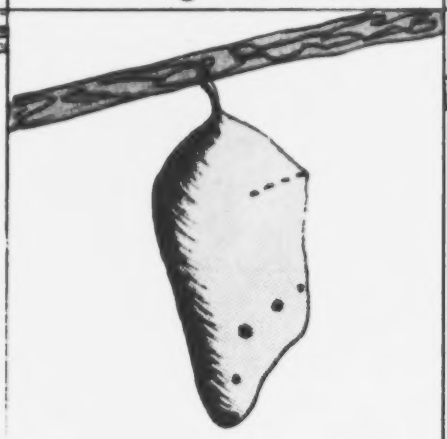
Feeding on Milkweed



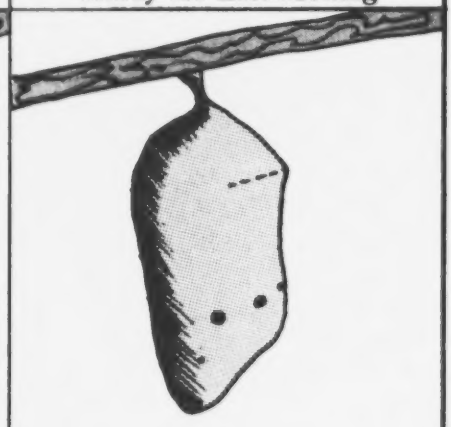
Feeding on Milkweed

Ready for Last Molting

Ready for Last Molting



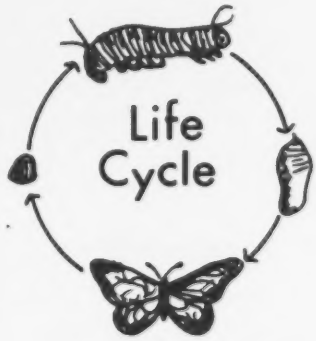
Pupa - Chrysalis



Pupa - Chrysalis

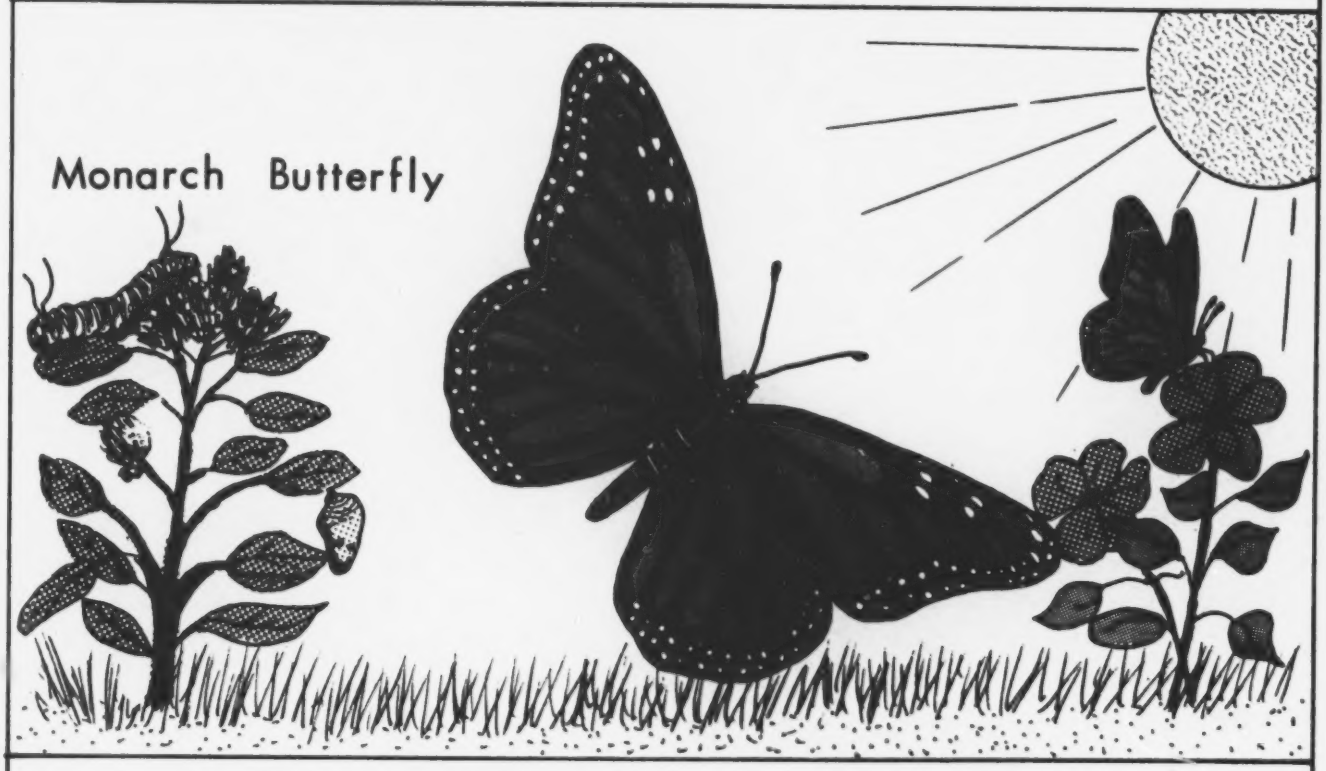
Adult Butterfly

Adult Butterfly

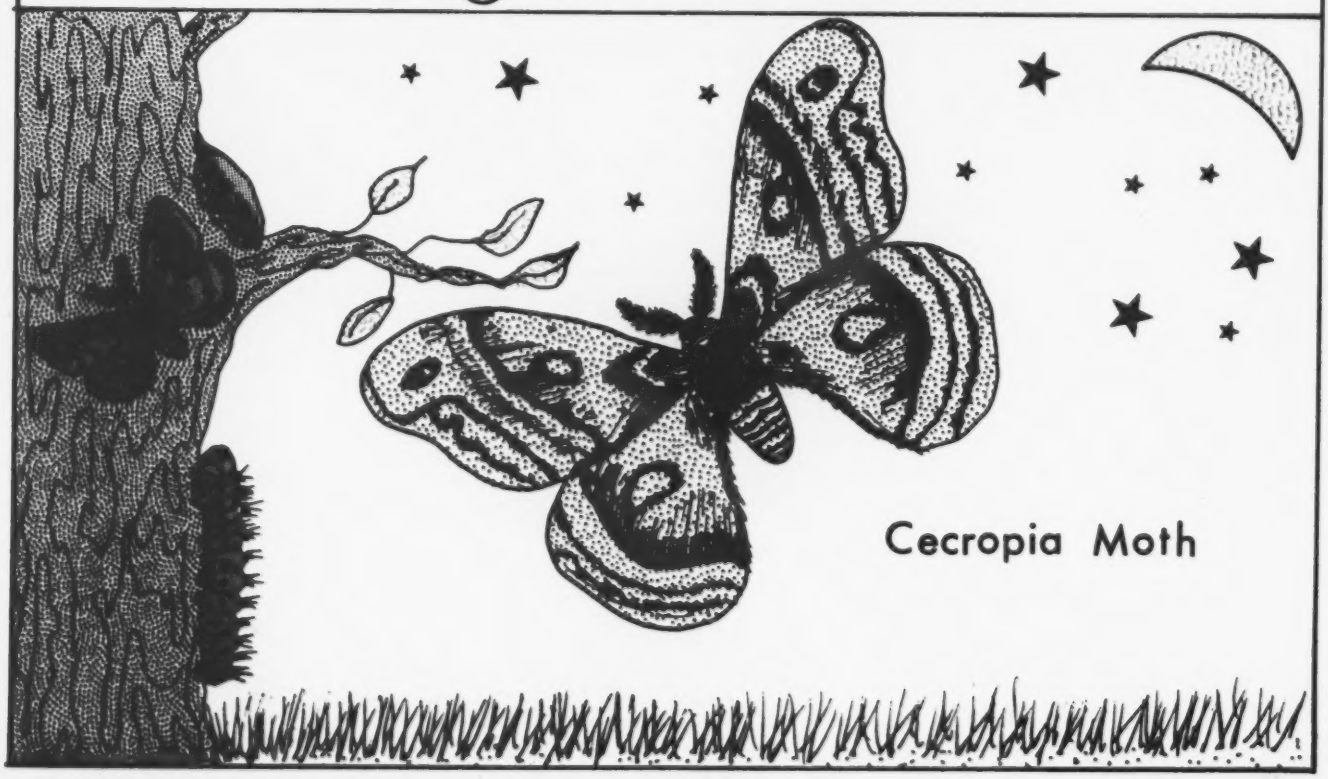


Monarch Butterfly

Daytime Butterflies



Nighttime Moths



The Butterfly Usually Has:

1. _ _ _ _ _ _ _ antenna
2. a _ _ _ _ _ _ body
3. a _ _ _ _ _ _ _ _ _ that protects its pupa
4. active _ _ _ _
5. _ _ _ _ _ _ wings at rest
6. a _ _ _ _ _ _ caterpillar

The Moth Usually Has:

1. _ _ _ _ _ _ _ _ _ antenna
2. a _ _ _ _ _ body
3. a _ _ _ _ _ _ that protects its pupa
4. active _ _ _ _ _ _
5. _ _ _ _ wings at rest
6. a _ _ _ _ _ caterpillar

Word List

open	hairy	closed	days
nights	feathered	clubbed	smooth
broad	chrysalis	narrow	cocoon

TH
KINKY
HE
BUTTERFLY
I LOVE
SIPPING
FLOWERS !

TEACHER/PARENT GUIDE

MEET KINKY CATERPILLAR (p. 1)

DISCUSSION: Have the children ever found a caterpillar? What was the caterpillar like? Was the caterpillar eating (what?), hiding (where?) or crawling around when it was discovered?

LEARNING ACTIVITY: The activity pages begin with a picture puzzle of a caterpillar named Kinky who loves eating plant leaves. Most caterpillars feed on leaves until they are ready to change into daytime-flying butterflies or night-flying moths. Look for Kinky, your caterpillar "guide" for insects, throughout these science activity pages. Each child can make a caterpillar cover for his own insect book by cutting out the pieces of the puzzle, assembling them and then pasting the completed picture to tagboard. The back cover (page 25) may also be completed at this time if desired. By tape binding the front cover to the back, each child can have a book folder to hold the remaining activity sheets as they are completed.

Kinky looks like this:

Front Cover

Back Cover

VOCABULARY: caterpillar, leaves

KINKY CATERPILLAR GOES EXPLORING (p. 2)

DISCUSSION: Plant leaves are important to many insects, including caterpillars, for food and shelter. When the children discovered insects among garden or field plants, did some insects move away quickly while others remained very still? Why might insects act differently? Can insects look like their food plants?

LEARNING ACTIVITY: Take a "Weed Walk" in the fall or spring to notice signs of insect activity. The "walk" can be around the school yard. Check weeds growing near fences as well as any trees and bushes. Children can be insect detectives and look for clues, i.e., chewed leaves, curled up leaves, small droppings, silky weblike shelters, etc.

Answer Key for missing picture words: caterpillar, leaves, insects, insects.

EXTENDING ACTIVITY: Pictures of insects that have adapted their sizes, shapes and colorings to their surroundings may be available from the public library or can be purchased from a school supply store. Many familiar insects like grasshoppers, crickets, certain caterpillars, moths and butterflies use some form of camouflage. It is also true that brightly colored and easily seen insects may have a bad taste and their vivid appearance advertises this fact to would-be predators.

VOCABULARY: insects, shelter, food plants

INSECTS HAVE SPECIAL PARTS (pp.3-4)

DISCUSSION: Children are familiar with many types of insects and noninsects. Discuss why some are considered true insects (six legs, two feelers) while others are only "insect like."

LEARNING ACTIVITY: Play the "Spot an Insect" Game. Hold up pictures of noninsects like a spider, snail, earthworm and small crab, along with pictures of true insects. Children stand if picture shown is a true insect and remain seated if it is not. Question their conclusions. Be sure to include a caterpillar and butterfly picture so this stage in the development of a true insect can be explained. While still a caterpillar, this insect can have as many as sixteen legs (six true legs, ten false legs). The true legs will become the adult butterfly's six insect legs while the ten false legs will no longer be seen. Note that Kinky caterpillar has eight pairs or sixteen legs. The pointed triangular legs in the front of his body are the true legs. What shape are Kinky's false legs? If possible have the children identify the true and false legs on a live caterpillar.

Answer Key: The grasshopper is missing one leg and one feeler. The ladybug is missing four legs. The fly is missing three legs and two feelers.

VOCABULARY: feelers, legs, true, false

FRIEND OR ENEMY? (pp.5-6)

DISCUSSION: Talk with children about good or bad characteristics of known insects. Could any of these insects be brought safely into the classroom? Why might plastic containers be better to use than glass for a temporary insect house? Why should small holes be punched in the tops and sides of plastic containers?

LEARNING ACTIVITY: Have the children look for insects in their own backyard and bring them to class, if possible. **Helpful Housing Hint:** Black or navy nylon netting can be obtained inexpensively from a fabric store. Remove cover of a large plastic container and cut out the center. Now place a piece of netting over the container and replace cover. The dark netting will provide a clear view of the insects inside the container. If the insects were found feeding on leaves or flowers, try to keep a fresh supply of

this food plant in the container. Keep the container clean by wiping it out with a paper towel dampened with water. (No soap please!)

If insects cannot be brought into the classroom, the children can make a picture record of insects discovered and where they were found, i.e., on flower, plant leaf, sidewalk, etc. Encourage the children to share their insect story papers with the class.

Answer Key for Kinky's Big Backyard: Answers will vary according to the child's personal experience. At this time all answers are acceptable. It is possible the children will consider certain insects differently after completing the other activities in this book.

VOCABULARY: friend, enemy, plastic, glass

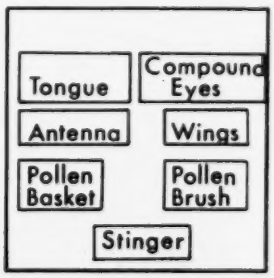
BZZZ BZZZ BUSY BEE (pp.7-8)

DISCUSSION: Many children consider all bees enemies because they can sting. Introduce the honeybee as an insect friend and explain use of the stinger only as defense. Discuss important parts of the bee, i.e., tongue for sipping flower nectar to make honey, antennas for smelling, compound eyes for seeing in all directions, brush and basket for gathering pollen from flowers, etc.

LEARNING ACTIVITY: Dandelions, clover or other common wild flowers can be found growing in or near most school yards. Take a "Wild Flower Walk" just to see the busy bees at work. Quietly watch the bees feed on sweet flower nectar. Tell the children this nectar will be used to make honey in the honeybee's special "honey tummy." You may also notice pollen powder on the bee's body and legs. Caution the children on disturbing the honeybees before undertaking this walk, since they must be approached slowly, quietly and with care. Should this kind of observation be inadvisable for your class, excellent photographs of nectar-feeding, pollen-collecting honeybees are available from most libraries or can be purchased from school supply stores.

Answer Key: Build a busy honeybee by cutting out the important parts on broken lines and gluing in the proper square as indicated by the arrows.

VOCABULARY: honeybee, compound eyes, tongue, antenna, flower nectar, pollen, seeds



DISCOVERING POLLEN (pp.9-10)

DISCUSSION: The bees are very important to flowers as pollen dusters. Pollen is a powder that has to be spread or dusted within a flower or from flower to flower so seeds can form.

Have the children name some other powders, i.e., baby powder, soap powder, etc. If you touch powder with your finger, will some powder stick to your finger? Try touching the same powder with an artist's paintbrush. Will the brush hold more powder than your finger? Now blow on your powdered finger and then on the brush. Which has more powder left on it, the brush or your finger? Bees have very hairy bodies just like the paintbrush. Do you think a hairy body would pick up more pollen powder than a smooth-skinned body? Would the pollen powder drop from a hairy body easier than from smooth skin like your fingers?

LEARNING ACTIVITY: Use a toothbrush or coarse artist's brush on the center of fresh flowers such as dandelion, tulip, crocus, aster or zinnia. When brushing centers, hold over black flowers found on page 10. Secure any released pollen with clear transparent tape. Have the children check the pollen powder with a magnifying glass.

If real flowers are unavailable, try this experiment. Fill a small container with baby or dusting powder. Each child can touch the powder with one finger and then touch the first black flower on his paper. Cover the powder print with a piece of clear tape. Next, the child touches the powder with a cotton ball and then touches the ball to the second black flower. Secure the cotton ball print with tape, also. Compare the amount of powder on each flower. What does this experiment tell you about the bee's hairy body?

VOCABULARY: powder, pollen brush, pollen basket, hairy, smooth

BEES, SEEDS, AND ME! (pp.11-12)

DISCUSSION: Identify fruits and vegetables pollinated by bees. Remind the children that fruits and vegetables grow flowers when they are young plants. It is in the flower that the seeds are first formed, thanks to the pollen-dusting bees.

LEARNING ACTIVITY: Where are the seeds found in the fruits and vegetables pictured? Do we ever eat seeds? After learning about helpful honeybees, why not have a "Bee Day Celebration"? Each child brings in an apple for a snack. Section the apples. (Save some seeds for soaking in water and planting.) Give each child a little cup of honey placed on a paper plate or napkin. The apple sections are then "honey dipped" for a delicious and nutritious snack. The snack may be served on "bee place mats" made out of plain sheets of paper that the children have decorated with crayon drawings of bees, flowers, fruits, etc.

EXTENDING ACTIVITY: Beeswax is an interesting topic for discussion. A cardboard box can be decorated to look like a beehive. Items made with beeswax can be placed in the "hive." Crayons, candles, lipstick, chewing gum, furniture and floor waxes, artificial waxed fruit, etc., are among the items you may wish to include. You may again want to ask the children, "Is the honeybee a friend or enemy?"

Answer Key: sweet corn, apples, peas, strawberries, watermelon, pears

VOCABULARY: fruits, vegetables, pollinated

BEETLES ARE LIKE THAT (pp.13-14)

DISCUSSION: The children can identify true insects (two feelers, six legs). Explain that further classification is possible by simply noting the insect's wing covering. Insects with a hardened outer wing that completely covers a soft underwing belong to the beetle family.

Beetles represent the largest group of insects. Probably the most popular of all beetles is the ladybug. Because most ladybugs feed on aphids and other insects that harm plants, they are very helpful to people. Aphids suck plant juices and in the process weaken or kill many plants people use for food.

LEARNING ACTIVITY: It is possible to find ladybugs and aphids in gardens and fields in early fall. Some plants the children might check are melons, cucumbers, cabbages, peas, and potatoes as well as fruit trees such as apples, pears, etc. Milkweed plants commonly found in fields also attract many aphids.

These insects may be temporarily housed for observation in the classroom, using a plastic container with netting. (See Teacher/Parent Guide, page 26) Some things to watch for: Which of the ladybug's wings are used for flying - the hardened outer covering or the soft underwing? Are the markings (spots) on the hardened outer covering arranged symmetrically? Can you find pairs of spots?

If the children count the spots they can further name the type of ladybug beetle they have discovered. Five, seven or nine-spotted ladybugs are most common. The odd numbered "spot" is shared, so the wing markings remain balanced or symmetrical.

It is fun to have the children bring in smooth oval-shaped rocks to paint like ladybugs. Red and black paint is all that's required and a reminder to pair the spots for symmetrical markings.

EXTENDING ACTIVITY: Although most ladybug beetles are helpful insects, the children may want to look for a yellow-colored ladybug that likes to eat bean plants. They can be found in abundance in late summer or early fall when gardeners no longer use insecticides because the best beans have been harvested. Often when the ladybug bean beetle is found on a plant, the larva or younger stage will also be eating the same plant.

These insects are very interesting to observe in a classroom insect house. Happy hunting!

Answer Key: Thirty aphids can be found on the apple tree. Aphids are about as large as a pinhead. The size of those pictured is necessarily exaggerated.

VOCABULARY: beetle, bug, ladybug, aphid, insect pest, wing covering, underwings, symmetrical.

FLASHING LIGHTS IN THE NIGHT (p.15)

DISCUSSION: The lightning bug is another popular insect belonging to the beetle family (two hardened wing covers over two soft wings). This insect is named for its special light, often seen flashing on warm summer nights. Have the children name different types of light that could be used to brighten a dark room. (i.e., candle, light bulb, flashlight) Would the lights mentioned produce "warm" or "cold" light? If a shaded light bulb is available, the children will be able to feel the light's warmth by holding their hands near it. The lightning bug's light is different from our "warm" man-made lights because it is "cold." When two chemical substances inside the insect's body combine or get together with air (oxygen), this special "cold" light flashes. A small jar containing over 100 flashing lightning bugs could never be warmed by their lights.

LEARNING ACTIVITY: Since lightning bugs are active at night, we say they are nocturnal insects. Both the male (boy) and female (girl) lightning bugs flash their cold lights at night from different places. The female carries many eggs inside her body. She hides in the grass and flashes her light so that a male flying in the air can find her. The male must fertilize the female's eggs or they will never hatch. As long as those little "cold" lights keep flashing there will always be new lightning bugs.

Answer Key: Kinky's tree tally should show four (4) females hiding in the grass and five (5) flying males.

EXTENDING ACTIVITY: Notice the black wing covers on the male lightning bugs pictured. The children can shade the soft underwings with their pencil lead. Comment that these underwings are actually doing the flying after the wing covers lift up.

VOCABULARY: lightning bug, warm, cold, nocturnal, male, female, eggs, fertilize, hatch

THE ANTHILL HOTEL (p.16)

DISCUSSION: Ants are interesting insects that are thought of as enemies or pests because they sometimes are discovered looking for food inside our houses, in picnic areas, etc. Beneath an anthill there are many rooms where a whole family or colony of ants can be found doing important things to keep their colony alive, well-fed and growing.

LEARNING ACTIVITY: This activity page gives the children a look inside an anthill housing a colony of honeydew ants. One of the rooms in the hill is a "honeydew dairy" where the ants feed aphid "cows" and then "milk" or stroke each aphid so the aphid will release a tiny drop of honeydew. The children will remember the aphid as an insect pest. (Activity, page 14) Besides the dairy, the anthill has a storeroom for keeping dead insects, another form of ant food.

The largest room in the anthill houses the female queen. She is larger than the other ants because her body is full of eggs. The worker ants care for the queen and the eggs she lays. The eggs are kept in a special room called the egg nursery until they hatch into legless segmented larva. The larva (the 2nd growth stage) are carried to another nursery where other larva are being fed and cared for along with many cocoons. A cocoon (the 3rd growth stage) is made by fully grown larva and shelters or protects the insect while it changes into an adult (the 4th and last stage).

Answer Key: Queen's room (4), Larva-cocoon room (5), Honeydew dairy (1), Egg nursery (2), Storeroom (3)

EXTENDING ACTIVITY: Ants have a special way of finding food outside their anthill. Some female workers are ant scouts and when they locate food they pick up as much as they can carry and return to the anthill. On the way back they leave a special smelling trail that other worker ants can easily follow to the food. It is interesting to watch ants finding food and quite possible to experiment with ant behavior while doing so. If the children place a rather large food scrap an observable distance from an anthill, it will trigger an ant food hunt. Cover the scouting ant's scent trail with pieces of paper. How long before other scouts have laid down a new trail?

How do you think ants find food inside our houses? How do they work together? If you try blocking an anthill entrance with a small pebble, you will see how strong tiny ants can be. You may also be able to unearth an ant colony by lifting up old logs, stones, etc. Look for the queen. Remember her size?

VOCABULARY: ant colony, honeydew dairy, storeroom, nursery, larva, cocoon, adult, ant scout, scent trail

PICK A NUMBER AND A NAME (pp. 17-18)

DISCUSSION: The mosquito is one of the most annoying insect pests in warm weather. Only the female mosquito bites because she needs blood in order to produce eggs. Discuss the time of day mosquitoes bite the most-when the sun is shining brightly or at night when it is warm and dark? Can the children name places where there would usually be lots of mosquitoes? (i.e., in the woods, near ponds, or in dark, damp areas, in wet fields with tall grasses and weeds) Actually, mosquitoes are nocturnal like the lightning bug beetle but for a different reason. Mosquitoes avoid bright sunlight because it dehydrates them or dries them up. (A good example of dehydration is a juicy grape left sitting in sunlight to become a nonjuicy raisin.) Mosquitoes must have moisture to survive, so they are most active at night.

LEARNING ACTIVITY: Mosquitoes go through a complete metamorphosis or total change from egg to adult just like all the other insects covered in these activity pages. It is possible for children to recognize these stages of growth which can be observed sometimes on the edge of a dark pond or in puddles after a spell of warm, rainy weather. Activity pages 17 and 18 cover the four stages of growth with magnified pictures.

Answer Key: adult mosquito (4), wiggler larva (2), eggs (1), pupa (3)

VOCABULARY: mosquito, dehydrate, wiggler larva, pupa

FOLLOW THAT FLY WITH THE SIX DIRTY FEET (p. 19)

DISCUSSION: The fly is a common insect pest that can often be found around both good and bad smelling things. If something has an odor, a fly will find it because he has two antennae (feelers) for smelling and large compound eyes for seeing in all directions. Flies are carriers of germs and disease because they lay their eggs in very filthy places and their pale wormlike larva eat these dirty, spoiled or decayed things until they are fully grown. Then they make a small brown cocoon and change into an adult fly. The adult fly's six insect legs are very hairy and easily pick up germs and bacteria. (This is a good time to recall the honeybee's hairy body and the experiment on page 10.)

LEARNING ACTIVITY: The child places a pencil on the fly at the top of page 19. Following the dots will take the fly to the dirty garbage can. From there he flies inside the kitchen window through a hole in the screen attracted by a delicious smelling pie cooling on the counter. The pie is too hot to eat so he lands on the dog's dinner. Then he flies to the kitchen table and lands on plates, etc.

Answer Key: The fly's dirty feet touched the following items in this order: (1) dog's dinner, (2) silverware, (3) fish on dinner plate, (4) edge of drinking cup, (5) peas and mashed potatoes, (6) drinking glass, (7) fish on serving platter, (8) bowl of mashed potatoes on counter, (9) bowl of peas, (10) fish, (11) water faucet, (12) stacked clean dishes.

VOCABULARY: fly, odor, attract, antenna, compound eyes

MOLTING MAGIC (p. 20)

DISCUSSION: Have the children had the experience of putting on a winter coat that was too small because they had grown since they had worn the coat the winter before? How did the coat feel? This is very much like what happens to insects during their larval stage of growth when they are doing a lot of eating and growing larger rapidly. The larva's skin will not grow so it eventually gets too small and has to be shed or "molted." A larger skin is waiting underneath the tight outer skin. After molting, the

new skin must dry and then the larva can again resume eating. In most insects the larval covering is outgrown four or five times. Insects often eat the molted covering because it is made of chitin, an important source of protein.

LEARNING ACTIVITY: When butterfly and moth eggs hatch we call the larva a caterpillar. Kinky is pictured on page 20 hanging from a branch ready to molt for the fifth and last time. Kinky hangs without falling because his last pair of false legs (claspers) are holding onto a pad of silk. Caterpillars make silk with a spinneret located just below their mouths. When it is first spun, the silk is wet and sticks to any surface. When it dries the silk aids the caterpillar by holding the old skin covering, while the new larger coat breaks free of it. With its last molting the appearance of the insect changes completely, for it is now a pupa. Usually the pupa has a protective covering called a cocoon or, in the case of the butterfly, a chrysalis.

Answer Key: On page 20 the children should locate five molted skins. These may be circled or the children can draw a caterpillar on the leaf in front of each molted skin. Remind them to begin on the left side with the smallest molted coat and caterpillar. The fifth molting shows the pupa-chrysalis and it may be colored green. With molting number five Kinky caterpillar is no more, for Kinky a pupa has taken his place.

VOCABULARY: molting, outer skin, larval coat, silk, spinneret, chrysalis, butterfly, moth

BUTTERFLY CONCENTRATION (pp. 21-22)

DISCUSSION: Butterflies, one of the most beautiful insects, go through a complete metamorphosis. Can the children name the four stages and indicate which pictures on pages 21 and 22 represent each stage? The butterfly pictured is a monarch. This bright orange butterfly is famous for flying long distances (up to 1800 miles) in the early fall to spend the winter in the South. The monarch heads back North in the spring when its caterpillar food plant, the milkweed, has again started growing. Milkweed, too, is well-known and grows wild in many areas. Its green leaves will drip a milky white liquid if pulled from the plant stem (thus, the name milkweed) and in the fall it has large seedpods that release hundreds of silky, parachute-topped seeds.

LEARNING ACTIVITY: The children can easily identify this famous butterfly's food plant by checking fields or weedy areas near their homes or school in the fall when the seedpods have formed. (Quite possibly the children will discover aphids and ladybugs on the milkweed as described on activity sheet 14.) If the milkweed pods that are found are green, they should be allowed to ripen before trying the following. Take some ripened pods to a field or open space and pretend to be the wind, blowing the seeds from the pods. Have the children watch the direction of the seed's flight. Why do the seeds always fall downwards even if blown straight up in the air? You may want to try this experiment indoors with just a few seeds. How does the way this seed is made help the milkweed plant?

With a little preplanning and fieldwork, it is very possible to raise the monarch inside the home or classroom. Late in the summer or in early fall, monarch caterpillars can still be found on the milkweed plants. When looking for them check under the milkweed leaves. The found caterpillars can be kept in a container as described in the Teacher/Parent Guide, page 26. Supply the caterpillar with fresh milkweed that has been cut so the stems will not be too long for the container. Do not pull the milkweed from the ground as new growth will appear on the cut stem. Check the leaves for other insects and remove them. Punch a hole in the metal lid of a baby food jar or similar container, fill with water and insert milkweed stems. If necessary, block lid hole with a piece of cotton to prevent caterpillar from falling in water. Raising a monarch is a tremendous science experience for both the children and the adults involved, so good luck and happy hunting!

The life cycle picture cards on pages 21 and 22 can be cut out, colored and mounted on tagboard to be used for a Concentration card game or as sequence cards. The following guide will help the children color the card pictures accurately.

milkweed leaf	green
egg	white/yellow
caterpillar	black/white yellow striped
chrysalis	light green
butterfly	orange with black markings

VOCABULARY: life cycle, metamorphosis

DAYTIME BUTTERFILES - NIGHTTIME MOTHS (pp. 23-24)

DISCUSSION: Moths and butterflies belong to the same family of scaley winged insects. Can the children name two insects belonging to the beetle family because their wing coverings are the same? (ladybug, lightning bug)

LEARNING ACTIVITY: It is interesting to make a comparison between insects in the same family. We can do this by looking at differences in appearance and habits. This activity can help the children identify butterflies and moths when they are found in nature. The pictures on page 23 answer the following:

Answer Key: A butterfly usually has.....

1) clubbed antenna
2) narrow body
3) chrysalis protecting pupal stage
4) active days
5) closed wings at rest
6) smooth caterpillar

A moth usually has.....

1) feathered antenna
2) broad body
3) cocoon protecting pupal stage
4) active nights
5) open wings at rest
6) hairy caterpillar

VOCABULARY: scaley, clubbed, feathered, narrow, broad, smooth, hairy

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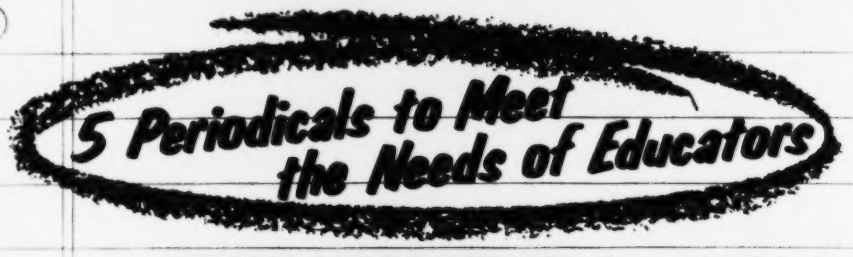

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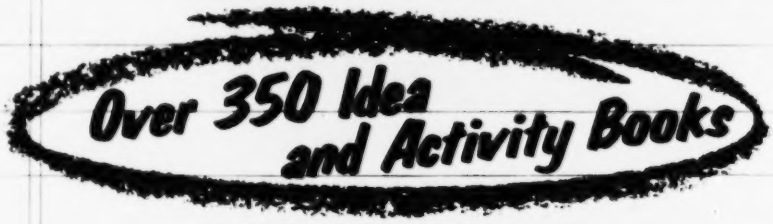

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